

10/18/17 "Its always too early to quit." -Norman Peale

HW: "2017 A2 CC L15 Solving Exponential Equations" finish  
Test 3 on Monday 10/30

AIM: How do we solve exponential equations?

Warm Up:

Please fill in the blank space with  $>$ ,  $<$ , or  $=$

1.  $4^6 \underline{=} 16^3$

$$(2^2)^6 \quad (2^4)^3$$

$$2^{12} = 2^{12}$$

2.  $9^5 \underline{>} 27^3$

$$(3^2)^5 \quad (3^3)^3$$

$$3^{10} > 3^9$$

3.  $25^4 \underline{<} 125^3$

$$(5^2)^4 \quad (5^3)^3$$

$$5^8 < 5^9$$

## Topic: Exponential/Power Equations

If the bases of an exponential equation are the same, then set the exponents equal and solve.

exponent  
base

If the bases are not the same, try to re-write one or both of them in order to get a common base. (Use powers)

Try to write the bigger  
base as a power of the smaller.

1.  $2^{x+3} = 64$

$$2^{x+3} = 2^6$$

$$64 = 2^6$$

sub

$$\begin{array}{r} x+3 = 6 \\ -3 \quad -3 \\ \hline x = 3 \end{array}$$

2.  $9^{2x} = 3^{3x+1}$

$$(3^2)^{2x} = 3^{3x+1}$$

$$3^{4x} = 3^{3x+1}$$

$$\begin{array}{r} 4x = 3x+1 \\ -3x \quad -3x \\ \hline x = 1 \end{array}$$

3.  $4^x = 2^{3x+1}$

$$(2^2)^x = 2^{3x+1}$$

$$2^{2x} = 2^{3x+1}$$

$$\begin{array}{r} 2x = 3x+1 \\ -3x \quad -3x \\ \hline -x = 1 \\ \hline x = -1 \end{array}$$

4.  $27^x = 9^{2x-1}$

$$(3^3)^x = (3^2)^{2x-1}$$

$$3^{3x} = 3^{4x-2}$$

$$\begin{array}{r} 3x = 4x-2 \\ -4x \quad -4x \\ \hline -x = -2 \\ \hline x = 2 \end{array}$$

$$5. 9^{x+5} = 81^{2x+1}$$
$$9^{x+5} = (9^2)^{2x+1}$$

$$x+5 = 4x+2$$
$$\begin{array}{r} -4x \quad -4x \\ \hline -3x + 5 = 2 \\ \quad -5 \quad -5 \\ \hline -3x = -3 \\ \quad -3 \quad -3 \\ \hline x = 1 \end{array}$$

$$8. \left(\frac{1}{2}\right)^x = 4$$

$$9. 5^{4x+2} = 1$$